reduction. Moreover, Mn (II) was not attributed to physical adsorption at the cell surface for 48 hr of incubation. Nevertheless other mechanisms might be involved in MnO_2 reduction since chemical reduction in a sterile distilled water with oxalate (0.2 M) was only about 20% of the amount of MnO_2 reduced by MR4. We conclude that the MnO_2 was efficiently reduced by organic acids such as oxalate and pyruvate produced by MR4.

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Characterization of Iron-Reducing Bacterium, *Shewanella putrefaciens* DK-1 ; Utilization of Electron Acceptors and Donors

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Shewanella putrefaciens DK-1 was a gram-negative, facultative anaerobic Fe(III) reducer and use ferric iron as a terminal electron acceptor for the oxidation of organic compounds to carbon dioxide or other oxidized metabolites. The ability of reducing activity and utilization of various electron acceptors and donors for *S. putrefaciens* DK-1 were investigated. *S. putrefaciens* DK-1 was capable of using a wide variety of electron acceptor, including nitrate, Fe(III), AQDS, and Mn(IV), however it's ability to utilize electron donors was limited. Lactate and formate were used as electron donors but acetate and toluene were not. Fe(III) reduction of *S. · putrefaciens* DK-1 was inhibited by the presence of either nitrate or nitrite. Also, *S. putrefaciens* DK-1 used humic acid as an electron acceptor and humic acid was reoxidation by nitrate. Environmental sample showing the Fe(III)-reducing activity was used to investigate the effects of limiting factors such as carbon, nitrogen and phosphorus on the Fe(III) reducing bacteria. Fe(III) reducing activity was measured the highest value, when added lactate as carbon source and *S. putrefaciens* DK-1 as Fe(III) reducer, in untreated sediment samples of Cheon ho and Dae ho reservoir.

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Isolation of Acidotolerant Naphthalene-Oxidizing Bacteria from Soils Contaminated with Alkyl Benzenes

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The potential for biodegradation of aromatic hydrocarbons was evaluated in contaminated soils near alkyl benzene storage tanks in Ulsan petrochemical industrial complex. The pH values of 6 samples ranged from 3.8 to 6.9, and the organic matter content was between 2.3 and 4.8% (w/w). Enumeration of heterotrophs and naphthalene-oxidizers was performed using the most probable number(MPN) technique. The numbers of heterotrophs growing at pH 7 ranged from 9.5×10^2 to 1.1×10^5 cells/g of soil, while those growing at pH 4 were between 4.7×10 to 3.6×10^4 cells/g of soil. In the soil samples, the numbers of heterotrophs growing at pH 7 were higher than those growing at pH 4. Estimates of naphthalene-oxidizers were less than 2.0×10 cells/g of soil regardless of the medium's pH. From the positive MPN tubes for naphthalene-oxidizers, we could isolate 12 strains that could grow using naphthalene as a sole carbon/energy source. Eight of the isolates showed naphthalene-degrading activities at pH 4, although they grew faster at the medium of pH 7 than pH 4. Bioaugmentation of these isolates can be considered for the remediation of the contaminated soils.